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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Tae-Sun Kim

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EXAMINER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/811,993	Applicant(s) KIM ET AL.	
	Examiner Trang U. Tran	Art Unit 2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) 24-31 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 32-34 is/are allowed.
- 6) ☒ Claim(s) 1,3-8,10-21 and 23 is/are rejected.
- 7) ☒ Claim(s) 22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1, 3-8, and 10-23 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 3-8, 10-21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (U.S. Patent No. 5,943,099) in view of Yang et al (U.S. Patent No. 7,042,512 B2) and further in view of Dougall et al (U.S. Patent No. 5,019,903).

In considering claim 1, Kim discloses all the claimed subject matter, note 1) the claimed performing, by an interlaced-to-progressive (IPC) converter, one of at least two

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interlaced-to-progressive conversion (IPC) techniques on input interlaced scan data is met by the spatial interpolator 110 and the temporal interpolator 120 (Fig. 1, col. 3, line 48 to col. 4, line 21), and 2) the claimed one of the at least two IPC techniques generating at least one scan line of including spatio-temporal pixel values is met by the selector 140 which selects a signal Is output based on basis of the compared results as an interpolated signal Vout (Fig. 1, col. 3, line 48 to col. 4, line 21 and col. 6, line 50 to col. 7, line 32). However, Kim explicitly does not disclose the limitation that the performing step is selectively based on a received control command, the control command indicates to perform one of at least a spatial interpolation IPC technique and a spatial/temporal interpolation IPC technique generating at least one scan line including spatial-temporal pixel values, each spatio-temporal pixel value being a combination of a spatially interpolated pixel value and a temporally interpolated pixel value.

Kim also teaches in the Related Art that, recently, the interlaced-to-progressive conversion apparatus has become more important since a high definition (resolution) television (HDTV) system adopts a plurality of standards on signal formats and the conversion among stand input/output signals of various formats is required frequently (see col. 1, lines 21-26).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the conversion among standard input/output signals of various formats as taught in Kim's Related Art into Kim's system in order to display different video signals having different format on different television receivers.

Additionally, Yang et al teach for each pixel to be interpolate, an adaptive selection unit 460 selectively outputs either the pixel generated by the motion compensated interpolate unit 440 or the pixel generated by the spatio-temporal interpolation unit 450 according to the motion type (global motion or local motion) determined by the motion type determination unit 424 and the accuracy of the motion vector estimated by the motion estimation unit 410 (see Fig. 4, element 460, col. 4, lines 31-38).

Therefore, it would have been obvious to one ordinary skill in the art at the time of the invention to incorporate the de-interlacing apparatus taught by Yang et al into Kim's system in order to improve the quality of the video signal by adaptively selecting interpolation methods according to motion type (col. 2, lines 35-40 of Yang et al).

The combination of Kim and Yang et al does not specifically disclose that the spatio-temporal pixel value being a combination of a spatially interpolated pixel value and temporally interpolated pixel value.

Dougall et al teaches in col. 10, lines 64-68 that "The above-described mixer could, as may be appreciated from the foregoing, be replaced by a switch. However, the user of a mixer is preferred since it reduces the possibility of switching artifacts being visible.

It would have been obvious to one ordinary skill in the art at the time of the invention to replace the mixer with the switch in order to increase the quality of the video signal by reducing the artifacts.

In considering claim 3, 1) the claimed wherein the spatial interpolation IPC technique performs spatial interpolation on a current field of the input interlaced scan data to produce a field of complementary scan data that together with the current field represents a frame of progressive scan data is met by the spatial interpolator 110 which is simple line doubling (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21 of Kim), and 2) the claimed the spatial/temporal interpolation IPC technique performs directionally adaptive spatial interpolation selectively combined with temporal interpolation using the current field, at least one previous field and at least one subsequent field of the input interlaced scan data to produce a field of complementary scan data that together with the current field represents a frame of progressive scan data is met by the spatio-temporal interpolation unit of Yang et al (Fig. 4, element 450, col. 4, lines 31-38 of Yang et al).

In considering claim 4, the claimed wherein the spatial/temporal interpolation IPC technique is adaptive is met by the spatio-temporal interpolation unit of Yang et al (Fig. 4, element 450, col. 4, lines 31-38 of Yang et al).

Claim 5 is rejected for the same reason as discussed in claim 3.

Claim 6 is rejected for the same reason as discussed in claim 1.

Claim 7 is rejected for the same reason as discussed in claim 3.

Claim 8 is rejected for the same reason as discussed in claim 1.

Claims 10-11 are rejected for the same reason as discussed in claims 3-4, respectively.

Claim 12 is rejected for the same reason as discussed in claim 6.

In considering claim 13, the claimed wherein the conversion structure comprises: an interpolator configured to interpolate lines of a frame of progressive scan data missing from a current field of the input interlaced scan data by spatially interpolating the missing lines using the current field is met by the spatial interpolator 110 (Fig. 1, col. 1, line 27 to col. 2, line 29 and col. 3, line 48 to col. 4, line 21 of Kim).

In considering claim 14, the claimed wherein the conversion structure is configured to supply the selector with the input interlaced scan data of a current field and one of a preceding and following field of the input interlaced scan data is met by the selector 140 which selects a signal Is output based on basis of the compared results as an interpolated signal Vout (Fig. 1, col. 3, line 48 to col. 4, line 21 and col. 6, line 50 to col. 7, line 32 of Kim).

In considering claim 15, the claimed wherein the conversion structure comprises: a spatial/temporal interpolator configured to perform a spatial/temporal interpolation IPC conversion technique on the input interlaced scan data to produce a portion of the progressive scan data is met by the spatio-temporal interpolation unit of Yang et al (Fig. 4, element 450, col. 4, lines 31-38 of Yang et al).

In considering claim 16, the claimed wherein the spatial/temporal interpolator is configured to perform adaptive spatial/temporal interpolation is met by the spatio-temporal interpolation unit of Yang et al (Fig. 4, element 450, col. 4, lines 31-38 of Yang et al).

In considering claim 17, the claimed wherein the spatial/temporal interpolator is configured to perform directionally adaptive spatial interpolation is met by the spatio-

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temporal interpolation unit of Yang et al (Fig. 4, element 450, col. 4, lines 31-38 of Yang et al).

In considering claim 18, the claimed wherein the spatial/temporal interpolator is configured to directionally adapt the spatial interpolation based on a measure of a difference between pixels neighboring a pixel being interpolated is met by the spatio-temporal interpolation unit of Yang et al (Fig. 4, element 450, col. 4, lines 31-38 of Yang et al).

In considering claim 19, the claimed wherein the spatial/temporal interpolator is configured to adapt the spatial/temporal interpolation based on a complexity of an image is met by the spatio-temporal interpolation unit of Yang et al (Fig. 4, element 450, col. 4, lines 31-38 of Yang et al).

In considering claim 20, the claimed wherein the spatial/temporal interpolator is configured to adapt the spatial/temporal interpolation to reduce an influence of the temporal interpolation as a change in an image over time increases is met by the spatio-temporal interpolation unit of Yang et al (Fig. 4, element 450, col. 4, lines 31-38 of Yang et al).

Claim 21 is rejected for the same reason as discussed in claim 3 and further the claimed the selector is configured to receive output of the interpolator, and output of the spatial/temporal interpolator is met by the mixer disclosed in Dougall et al, col. 10, lines 64-68 of Dougall et al.

Claim 23 is rejected for the same reason as discussed in claim 7.

Allowable Subject Matter

4. Claims 32-34 is allowed.
5. Claim 22 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Trang U. Tran whose telephone number is (571) 272-7358. The examiner can normally be reached on 9:00 AM - 6:30 PM, Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on (571) 272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

November 22, 2009

/Trang U. Tran/
Primary Examiner, Art Unit 2622